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Drimia acarophylla (Hyacinthaceae), a new species from Eastern Cape, South Africa

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***Drimia acarophylla*, a new, inconspicuous, dwarf species from the Albany Centre of Endemism in Eastern Cape, South Africa, is restricted to the Great Fish River floodplain where it is found in small colonies on bare patches of blue-grey pencil shale, where it is further camouflaged by the leaves resembling engorged female blue ticks. It shows affinity to *D. depressa* (Bak.) Jessop, which is known from the Eastern Cape to KwaZulu-Natal, Lesotho, Swaziland and Northern Province, in their shared capitate inflorescence and spreading tepals but is distinguished by its terete, succulent, clavate leaves with a cuticle of densely packed, multifaceted, erect wax platelets. Upon fading the inner tepals close first and their papillate apices fuse with the stigmatic papillae, the stamens wilt and the anthers connive with the style just below the stigma**.

Introduction

The genera of Hyacinthaceae with spurred petiolar bracts form the monophyletic group of the subfamily Urgineoideae. Within the subfamily, however, the genera are poorly defined. The two core genera, *Urginea* and *Drimia*, traditionally separated by the degree of fusion of the perianth and the orientation of the tepals and stamens, are regarded as a single genus following Jessop (1977) and Goldblatt and Manning (2000). *Drimia* is well defined by the apomorphic short-lived flowers with the tepals mostly more or less fused below and the perianth caducous, abscising at the base and withering as a cap on the developing fruit (Goldblatt and Manning 2000). The new species, treated as a species of *Drimia* is, however, unique in several characters and the delay in its description is due to the authors' initial uncertainty as to its generic level.

Material and Methods

Brink has studied living material of the new species for more than 20 years, while Dold has undertaken a survey of wild populations over a period of 10 years. Material was examined and measurements taken using a light microscope. Habitat slides were taken with an SLR camera and scanned to print. Pollen, seed, leaf epidermis and the petiolar abscission layer were examined with a JEOL–JSM 840 scanning electron microscope. Drawings were made from living plants collected in habitat.

Description

Drimia acarophylla E.Brink & A.P.Dold sp. nov.
Drimia depressa (Bak.) Jessop affinis sed folio succulento clavate tereto differt
TYPE. — Eastern Cape, 3326 (Grahamstown): Committees Drift, Tyefu Location, (–BB), 500m, 22–08–1991, *Brink 788* (GRA, holo., BOL).
Plants xerophytic, dwarf, succulent, inconspicuous, ± 30–40mm high, aggregated in small colonies. *Bulb* globose to imperfectly ovoid, hypogeal, (14–)18–20(–25) x (11–)14–16(–24)mm diam. with many spreading, white, fleshy, contractile roots at the base, tunic clothing the upper half, thin, flaking, papery, pale brown, not neck-forming. *Leaves* 1(–2), present or absent at anthesis, recumbent, deciduous, slender, semi-terete below surface, (6–)10–12(–14) x 1–3(–4)mm diam. at base, white; lamina succulent, terete, becoming clavate, (9–)15–17(–24) x (5–)6–8mm diam. at broadest point, often somewhat flattened to shallowly channelled adaxially, occasionally retuse at apex, smooth, becoming wrinkled, dark grey-green with a dull whitish bloom. *Inflorescence* single, subcapitate-racemose; peduncle slender, erect, smooth, (11–)18–22(–27) x (1–)2(–3)mm diam. at base, white, becoming dark glossy purple-red where exposed, 1–2mm diam. below raceme; bracts subtending the pedicels deltoid, 1.6–2.0 x 1.0–1.2mm at base, loosely clasping, attenuate, saccate, keeled, occasionally with a spur up to 0.3mm long, smooth, dark glossy purple-red; pedicels (1–)5–6(–9) x 0.6–0.8mm diam., dark glossy purple-red. *Flowers* (6–)9–12(–17), opening one per day from ± 10.00 to ± 17:00 in July to September, aborted

Figure 1: *Drimia acarophylla (Dold 4448)* in habitat

flowers abscising less than 0.6–1.0mm below insertion of tepals leaving a skirt of tissue as the pedicel dries. *Perianth* spreading-erect, fused for 0.4mm at base, shallowly cupped, tepal apices tipped with a cluster of white papillae, incurved, margins recurved, outer tepals ovate, 4.0–5.0mm x 1.8–2.0mm broad, outer surface purple-brown, inner surface white flushed pink, margin distinct, white, 0.4mm wide, apices obtusely pointed; inner tepals broadly elliptic, 4.0–4.4mm x 1.0–1.5mm broad, outer surface sandy apricot coloured with a purple-brown midrib, inner surface and margin translucent white, margin 0.4mm wide, recurved, apices truncate. *Stamens* erect; filaments lanceolate 1.8–2.0mm x 0.6–0.8mm broad at base, flat, 0.2mm thick, adnate to perigone base, white; anthers ovoid, bilobed, 1.6mm x 0.8mm diam., dorsifixed, versatile, pale green, dehiscing longitudinally; pollen ellipsoid, 0.11mm x 0.04mm, yellow. *Ovary* ovoid, 1.5–2.2mm x 1.6mm diam., shallowly 3-lobed, pale yellow; style terete, 1.6–2.0mm x 0.4mm diam. at base, white; stigma swollen, trihedral with stalked stigmatic papillae in three rows from apex to corners, white. *Capsule* orbicular, 4.5–6.4mm x 3.0–6.2mm diam., purple-brown to sandy apricot with the persistent circumscissile perianth capping the apex and leaving a basal annulus, 2mm diam., campanulate at dehiscence, leathery, pale pinkish-brown. *Seeds* ± 30 per capsule, each loosely enclosed by a tetrahedrally folded testa, 2–2.4mm x 1–2.2mm, glossy, black, shallowly reticulate, narrowly winged along the angles; cotyledon asymmetrically ovoid, 1.0–1.25mm x 0.7.5–0.8mm pale buff-brown with shallow foveolate dimples, apex acute, hilum rounded, attached to the inner surface of the apex of the testa by a delicate filamentous thread slightly longer than the cotyledon. Figures 1–4.

Taxonomy

Following Goldblatt and Manning (2000), *Drimia acarophylla* clearly falls into the *Urginea* group of the genus *Drimia* within the Urgineoideae, Hyacinthaceae. Jessop (1977) recognises three species of *Drimia* with capitate inflorescences, namely *D. depressa* (Bak.) Jessop, *D. sphaerocephala* Bak. and *D. marginata* (Thunb.) Jessop. *D. sphaerocephala* and *D. marginata* have recurved perianth segments, a character previously used to separate *Drimia* from *Urginea* (Baker 1897, Mauve 1976) while *D. depressa* and *D. acarophylla* have spreading perianth segments. The new species is unique in having clavate-terete succulent leaves and is easily distinguished from *D. depressa*, its closest relative, both florally and vegetatively (Table 1). The leaf epidermis of *D. acarophylla* shows a remarkable resemblance to that of some highly succulent species within the Aizoaceae featuring an epidermal wax layer of erect wax platelets (Figure 3a), for example, *Bergeranthus vespertinus* (A Berger) Schwantes (Dold 2002). *D. acarophylla* and *Ornithogalum unifoliatum* (Rowley) Oberm. (Obermeyer 1978) are vegetatively almost indistinguishable. We suggest that the two taxa evolved in parallel in response to their extreme microhabitats.

Floral phenology

Upon fading the inner tepals of the perianth close first and their papillate apices fuse with the stigmatic papillae. The stamens wilt and the anthers connive with the style just below the stigma before the outer tepals finally close the flower.

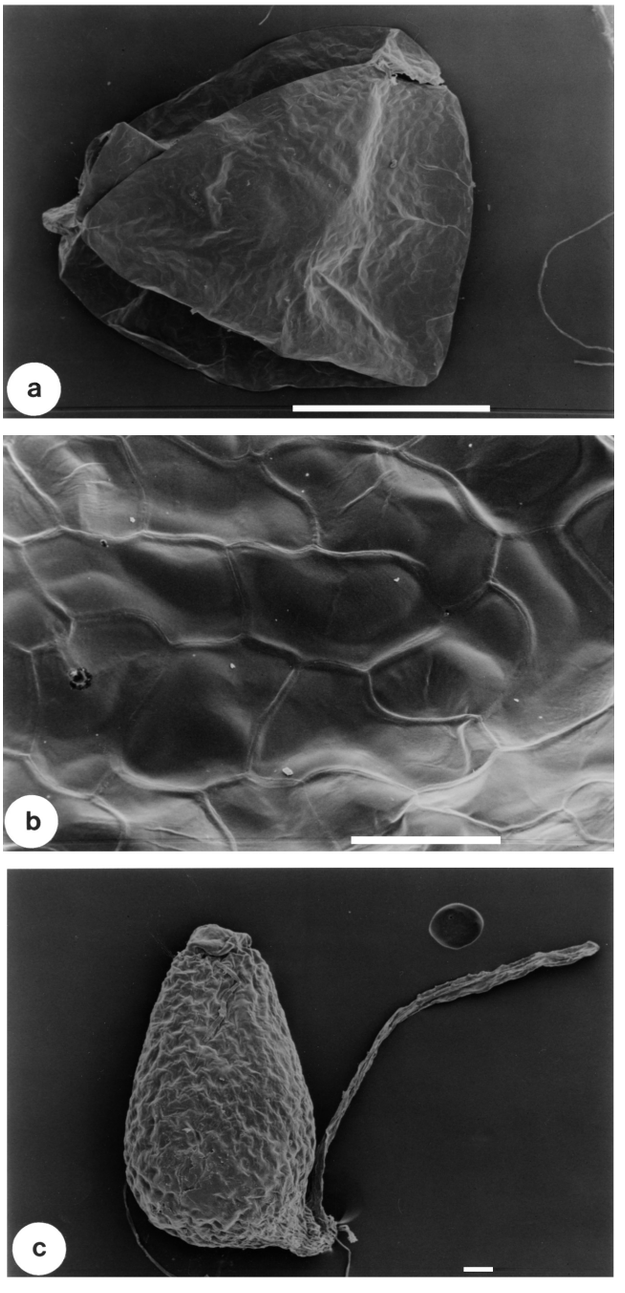

Figure 2: *Drimia acarophylla* (*Dold 4448*), **a**: seed; **b**: seed testa; **c**: seed cotyledon and filament. Scale bars a, 1mm; b, c, 100µm

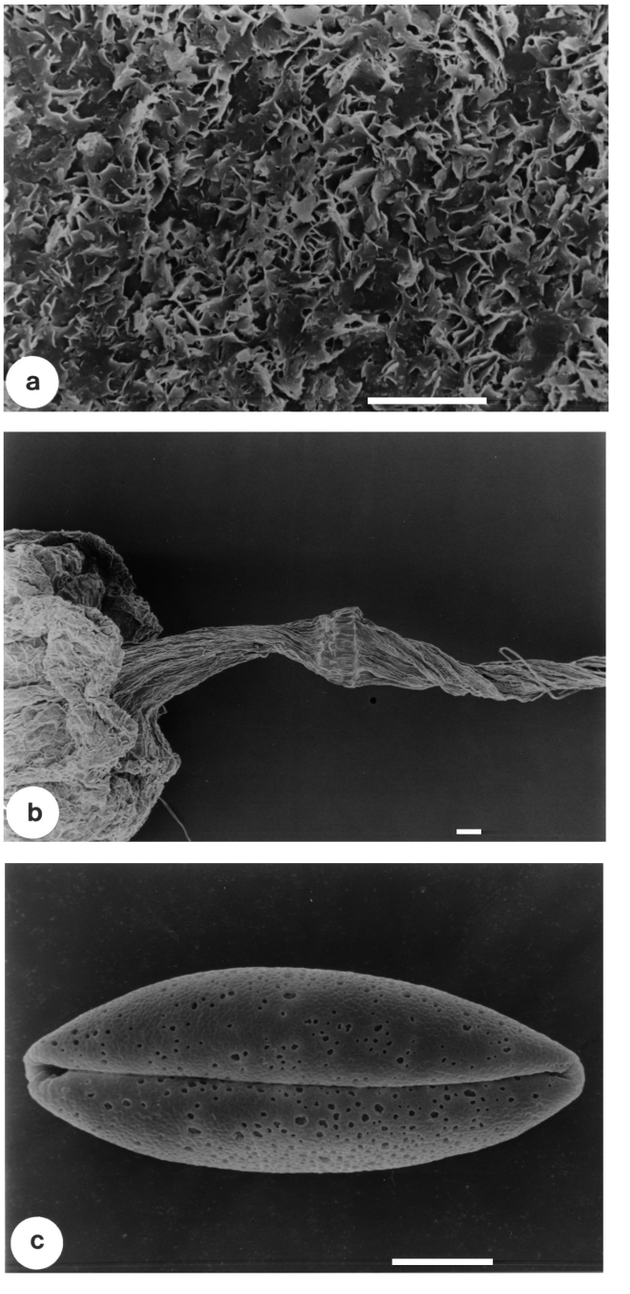

Figure 3: *Drimia acarophylla* (*Dold 4448*), **a**: leaf epidermal wax layer; **b**: abscission layer below aborted flower; **c**: pollen. Scale bars a, c, 10µm; b, 100µm

Distribution and ecology

First collected by Brink in 1978, this diminutive, inconspicuous plant has subsequently been re-collected by Dold at several localities in the Grahamstown District where it is uncommon and difficult to find. Restricted to the floodplain of the Great Fish River (Figure 5), the species is confined to bare patches of exposed loose pencil shale fragments of the Fort Beaufort Formation of the Ecca Group of shales (Johnson and Le Roux 1994). The leaves, which appear in July to August and die off in September to October, are well camouflaged by their resemblance in size and colour to the small pieces of shale flakes. Small colonies of up to 10 plants are isolated on raised humps of bare shale where extreme temperatures, exacerbated by the black shale, high insolation and poor nutrients, ensure that few other plants

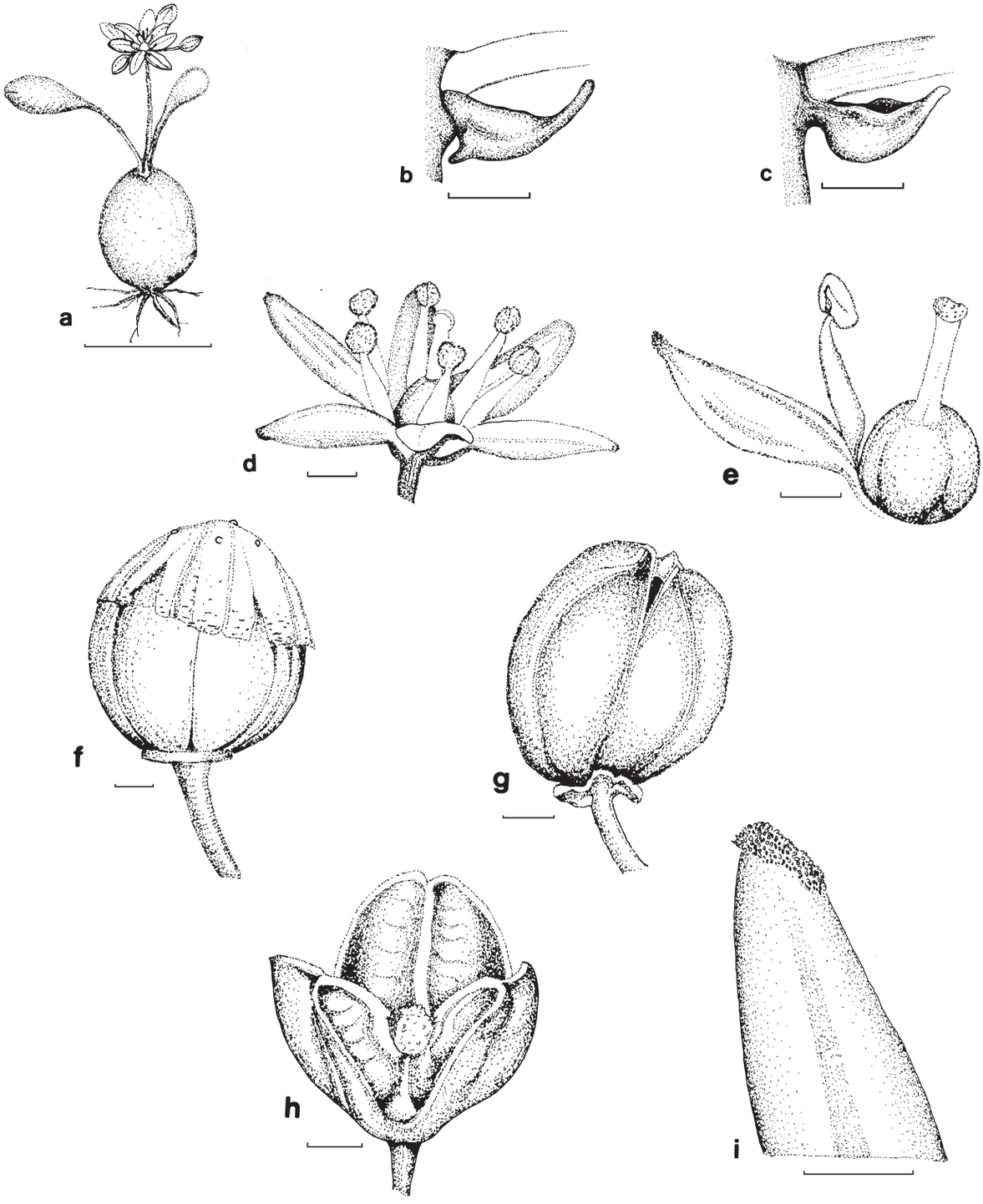

Figure 4: *Drimia acarophylla* (*Dold 4448*), **a**: plant habit; **b**, **c**: pedicel bracts; **d**: flower; **e**: section of flower; **f**: wet capsule; **g**: dry capsule; **h**: dehiscing capsule; **i**: tepal apex. Scale bars a, 10mm; b–i, 1mm. Illustrations A. Dold

Table 1: Morphological differences between *Drimia acarophylla* and *D. depressa*

	D. acarophylla	*D. depressa*
Bulb	14–25mm long	10–50mm long
Leaves	1–2, clavate, succulent, up to 14mm x 4mm diam.	5–8, linear to linear-lanceolate, herbaceous, up to 260mm x 26mm broad
Peduncle	up to 27mm long	up to 200mm long
Inflorescence	6–17 flowers	10–50 flowers
Perianth	inner tepals broadly elliptic, outer ovate	inner and outer tepals linear-oblong
Filaments	up to 2mm long	3–4mm long
Anthers	up to 1.6mm long, green	0.5–1.25mm long, brown
Capsule	orbicular, 4.5– 6.4mm long	ovoid, 5–8mm long
Seeds	2–2.4 x 1–2.2mm	4–4.5 x 3–4mm

survive. The average annual rainfall is 450mm. The leaf tips are often eaten, possibly by rodents. The specific epithet refers to the remarkable resemblance in colour and shape of the leaf to an engorged female blue tick (*Amblyomma* sp., Ixodoidea, Acarina). The dead leaves are further camouflaged by their extraordinary resemblance to old goat droppings.

Other specimens examined

EASTERN CAPE:
— 3326 (Grahamstown): Swartwaterspoort, Riebeek East, (–AA), 350m, 22–09–2002, *Dold 4451* (GRA); Coniston Farm, Fort Beaufort, (–AB), 450m, 27–10–1993, *Dold 312* (GRA); Lynton Farm, Piggott Bridge, Fish River, 300m, 25–09–2002, *Dold 4452* (GRA); Kwandwe Game Park, Krantz Drift, Fort Brown, 550m, 19–09–2002, *Dold 4453* (GRA); Krantz Drift, Fort Brown, 02–08–1982, *Skead s.n.* (GRA); Tempe Farm, Fort Brown, (–BA), 300m, 25–09–2002, *Dold 4451* (GRA); Tyefu Location, (–BB), 500m, 13–09–1978, *Brink 648*; 27–07–1979, *Brink 684*; 13–09–1979, *Brink 687*; 22–08–1991, *Brink 789, 790* (GRA); Glen Boyd Farm, Committees, 350m, 27–07–1979, *Brink 683* (GRA); Qamnyana, Committees Drift, 450m, 25–08–2002, *Dold 4448* (GRA).

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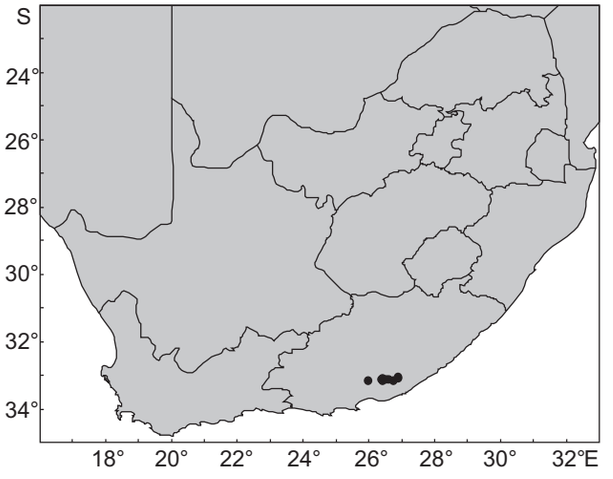

Figure 5: Known distribution of *Drimia acarophylla*

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